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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,200	04/19/2004	Zaki Moussaoui	2277-170	2321

7590 06/30/2005  
Lowell W. Gresham, Meschkow & Gresham  
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Phoenix, AZ 85014

EXAMINER

BARNES, CRYSTAL J

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/827,200	<b>Applicant(s)</b> MOUSSAOUI, ZAKI	
	<b>Examiner</b> Crystal J. Barnes	<b>Art Unit</b> 2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,8-10 and 12 is/are rejected.
- 7) ☒ Claim(s) 2,3,6,7 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

*ML*

### DETAILED ACTION

1. The following is an initial Office Action upon examination of the above-identified application on the merits. Claims 1-12 are pending in this application.

#### *Priority*

2. Applicant has complied with the conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 119(e).

#### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4, 5, 8-10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 5,505,180 to Otterman et al.

As per claim 1, the Otterman et al. reference discloses a linear predictive system for a DC-DC converter that generates an output signal based on duty cycle

and that includes a digital compensation block that converts a feedback error signal into a main duty cycle signal, said linear predictive system comprising: linear predictive controller (see column 2 lines 55-65, "module 20") that predicts linear changes of the main duty cycle signal (see column 3 lines 12-18, "constant frequency pulse width modulated fuel pump control signal") in response to changes of the output signal ("differential pressure") and that provides a predictive duty cycle signal (see column 3 lines 21-28, "vary the duty cycle of the PMW signal") indicative thereof; first adder (see column 4 lines 35-39, "summer 102") that subtracts said predictive duty cycle signal ("adaptive adjustment") from the main duty cycle signal ("base feedforward fuel pump duty cycle") to provide a duty cycle delta ("adjusted feedforward value"); multiplier (see column 4 lines 11-15 and 18-22, "flow adaptation block 100") that multiplies said duty cycle delta ("duty cycle") by a gain factor ("adaptive adjustments") to provide a duty cycle delta sample ("adjusted feedforward value"); and second adder (see column 3 lines 21-27, "summer 38") that adds said duty cycle delta sample ("adjusted feedforward value") to the first duty cycle signal ("base feedforward fuel pump duty cycle") to generate an adjusted duty cycle signal ("vary the duty cycle of the PMW signal").

As per claim 4, the Otterman et al. reference discloses a DC-DC converter comprising: a compensation block (see column 3 lines 17-21, "control strategy block 34") that converts a feedback error signal ("error output") into a first duty cycle signal (see column 3 lines 12-18, "constant frequency pulse width modulated fuel pump control signal"); a first combiner (see column 3 lines 21-27, "summer 38") that adds a duty cycle delta ("adjusted feedforward value") to said first duty cycle signal ("base feedforward fuel pump duty cycle") to generate an adjusted duty cycle signal (see column 3 lines 21-28, "vary the duty cycle of the PMW signal"); a DC-DC block (see column 2 lines 55-58, "power driver 22") that generates an output signal ("control signals") based on said adjusted duty cycle signal ("vary the duty cycle of the PMW signal"); a linear predictive controller (see column 2 lines 55-65, "module 20") that predicts changes of said first duty cycle signal ("constant frequency pulse width modulated fuel pump control signal") in response to changes of said output signal ("differential pressure") and that provides a predictive duty cycle signal ("vary the duty cycle of the PMW signal") indicative thereof; and a second combiner (see column 4 lines 35-39, "summer 102") that subtracts said predictive duty cycle signal ("adaptive adjustment") from said first duty cycle

signal ("base feedforward fuel pump duty cycle") to provide said duty cycle delta ("adjusted feedforward value").

As per claim 5, the Otterman et al. reference discloses further comprising a multiplier (see column 4 lines 11-15 and 18-22, "flow adaptation block 100") that multiplies said duty cycle delta ("duty cycle") by a loop gain factor ("adaptive adjustments") to provide a modified duty cycle delta ("adjusted feedforward value") provided to said first combiner ("summer 38").

As per claim 8, the Otterman et al. reference discloses further comprising a third combiner (see column 3 lines 18-22, "comparator 36") that subtracts said output signal ("actual differential pressure") from a reference signal ("desired differential pressure input") to generate said feedback error signal ("error output").

As per claim 9, the Otterman et al. reference discloses a method of operating a DC-DC power converter, comprising: converting a feedback error signal (see column 3 lines 18-21, "error output") into a first duty cycle signal (see column 3 lines 12-18, "constant frequency pulse width modulated fuel pump control signal"); subtracting (see column 3 lines 21-27, "summer 38") a duty cycle delta ("adjusted feedforward value") from the first duty cycle signal ("base feedforward fuel pump

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duty cycle") to provide an adjusted duty cycle signal ("vary the duty cycle of the PMW signal"); generating an output signal (see column 2 lines 55-58, "power driver 22") based on the adjusted duty cycle signal ("adjusted feedforward value"); linearly predicting changes (see column 2 lines 55-65, "module 20") of duty cycle (see column 3 lines 12-18, "constant frequency pulse width modulated fuel pump control signal") in response to changes of the output signal ("differential pressure") to provide a predictive duty cycle (see column 3 lines 21-28, "vary the duty cycle of the PMW signal"); and subtracting (see column 4 lines 35-39, "summer 102") the predictive duty cycle ("adaptive adjustment") from the first duty cycle signal ("base feedforward fuel pump duty cycle") to provide the duty cycle delta ("adjusted feedforward value").

As per claim 10, the Otterman et al. reference discloses further comprising multiplying (see column 4 lines 11-15 and 18-22, "flow adaptation block 100") the duty cycle delta ("duty cycle") by a loop gain factor ("adaptive adjustments").

As per claim 12, the Otterman et al. reference discloses further comprising subtracting (see column 3 lines 18-22, "comparator 36") the output signal ("actual differential pressure") from a reference signal ("desired differential pressure input") to provide the feedback error signal ("error output").

*Allowable Subject Matter*

5. Claims 2, 3, 6, 7 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references are cited to further show the state of the art with respect to predictive adaptive process control in general:

USPN 6,841,983 B2 to Thomas

USPN 6,593,725 B1 to Gallagher et al.

USPN 6,427,445 B1 to Isaac et al.

USPN 5,966,002 to Barrieau et al.

USPN 5,953,220 to Tsai et al.

USPN 5,282,123 to Boylan et al.

USPN 5,272,614 to Brunk et al.

USPN 5,237,975 to Betki et al.



USPN 4,317,040 to Wuerflein

US Pub. No. 2005/0110453 A1 to Lecky

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Crystal J. Barnes whose telephone number is 571.272.3679. The examiner can normally be reached on Monday-Friday alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 571.272.3687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



CJB

24 June 2005